

WHAT IS CLAIMED IS:

1. A joint angle indication system for providing information related to an angular relationship between a first body part and a second body part which are pivotally coupled at a joint, the system comprising:

5 a first arm member operable for attachment to the first body part, the first arm member having a first proximal end and a first distal end;

a second arm member operable for attachment to the second body part, the second arm member having a second proximal end and a second distal end, the second proximal end of the second arm member pivotally coupled to the first proximal end of the first arm member;

10 at least one joint angle variation sensor for providing at least one electrical characteristic which varies based on variation in a joint angle of the first arm member relative to the second arm member, where the joint angle is variable over an angular range which includes a first angle and a second angle;

15 a biofeedback circuit operable to generate a first feedback signal when the at least one electrical characteristic indicates the joint angle is less than or equal to the first angle, operable to generate a second feedback signal when the at least one electrical characteristic indicates the joint angle is greater than or equal to the second angle, and operable to generate no feedback signal when the at least one electrical characteristic indicates the joint angle is less than the second angle and greater than the first angle, where the second feedback signal is aurally different from the first feedback signal; and

20 an angle display circuit for visually displaying a joint angle value based on the at least one electrical characteristic.

2. The joint angle indication system of claim 1 wherein the at least one joint angle variation sensor further comprises at least one potentiometer mechanically coupled between the first and second arm members, and wherein the at least one electrical characteristic is an electrical resistance of the at least one potentiometer.

3. The joint angle indication system of claim 2 wherein:

5 the at least one joint angle variation sensor further comprises first and second potentiometers coupled between the first and second arm members, and wherein the at least one electrical characteristic includes a first electrical resistance of the first potentiometer and a second electrical resistance of the second potentiometer;

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the biofeedback circuit operable to generate the first feedback signal when the first electrical resistance of the first potentiometer indicates the joint angle is less than or equal to the first angle, operable to generate the second feedback signal when the first electrical resistance of the first potentiometer indicates the joint angle is greater than or equal to the second angle, and operable to generate no feedback signal when the first electrical resistance of the first potentiometer indicates the joint angle is less than the second angle and greater than the first angle; and the angle display circuit for visually displaying a joint angle value based on the second electrical resistance.

4. The joint angle indication system of claim 3 wherein:

the first arm member is forked at the first proximal end to form a first prong portion and a second prong portion;

the second proximal end of the second arm member is disposed between the first and second prong portions of the first arm member;

the first potentiometer is disposed between the second arm member and the first prong of the first arm member; and

the second potentiometer is disposed between the second arm member and the second prong of the first arm member.

5. The joint angle indication system of claim 1 further comprising:

a flexible sleeve operable to substantially surround the first and second body parts;

the first arm member having a first attachment plate pivotally attached thereto proximate the first distal end;

means for mechanically coupling the first attachment plate to the flexible sleeve;

the second arm member having a second attachment plate pivotally attached thereto proximate the second distal end; and

means for mechanically coupling the second attachment plate to the flexible sleeve.

6. The joint angle indication system of claim 5 wherein the means for mechanically coupling the first attachment plate to the flexible sleeve and the means for mechanically coupling the second attachment plate to the flexible sleeve further comprise a hook-and-loop fastener system.

7. The joint angle indication system of claim 5 wherein:
the means for mechanically coupling the first attachment plate to the flexible sleeve
comprises at least one first pocket in the flexible sleeve for receiving the first
attachment plate; and
5 the means for mechanically coupling the second attachment plate to the flexible sleeve
comprises at least one second pocket in the flexible sleeve for receiving the
second attachment plate.

8. The joint angle indication system of claim 1 wherein the first and second feedback
signals are audio signals, and the first feedback signal is aurally different from the second
feedback signal.

9. The joint angle indication system of claim 8 wherein the biofeedback circuit is operable
to generate the first feedback signal having a first audio frequency, and the second
feedback signal having a second audio frequency which is higher than the first audio
frequency.

10. The joint angle indication system of claim 8 wherein the biofeedback circuit further
comprises a first piezoelectric buzzer for generating the first feedback signal and a
second piezoelectric buzzer for generating the second feedback signal.

11. The joint angle indication system of claim 1 further comprising an audio output circuit
for generating an audio angle indication signal having a signal characteristic which varies
in relation to a variation in the at least one electrical characteristic.

12. The joint angle indication system of claim 11 wherein the signal characteristic which
varies in relation to a variation in the at least one electrical characteristic is the frequency
of the audio angle indication signal.

13. The joint angle indication system of claim 12 further comprising a microphone for
generating an audio annotation signal.

14. The joint angle indication system of claim 13 further comprising an audio recording
device operable to record audio information on at least first and second audio information
channels, the audio recording device for receiving the audio angle indication signal and
recording the audio angle indication signal on the first audio information channel, and for

5 receiving the audio annotation signal and recording the audio annotation signal on the second audio information channel.

15. A joint angle indication system for providing information related to an angular relationship between a first body part and a second body part which are pivotally coupled at a joint, the system comprising:

a first arm member operable for attachment to the first body part, the first arm member
5 having a first proximal end and a first distal end, the first arm member forked at the first proximal end to form a first prong portion and a second prong portion;

a second arm member operable for attachment to the second body part, the second arm member having a second proximal end and a second distal end, the second proximal end of the second arm member disposed between and pivotally coupled to the first and second prong portions of the first arm member;

a first potentiometer disposed between the second arm member and the first prong of the first arm member, the first potentiometer having a first electrical resistance which varies based on variation in a joint angle of the first arm member relative to the second arm member, where the joint angle is variable over an angular range which includes a first angle and a second angle;

a second potentiometer disposed between the second arm member and the second prong of the first arm member, the second potentiometer having a second electrical resistance which varies based on the variation in the joint angle;

20 a biofeedback circuit operable to generate a first feedback signal having a first audio frequency when the first electrical resistance indicates the joint angle is less than or equal to the first angle, operable to generate a second feedback signal having a second audio frequency which is higher than the first audio frequency when the first electrical resistance indicates the joint angle is greater than or equal to the second angle, and operable to generate no feedback signal when the first electrical resistance indicates the joint angle is less than the second angle and greater than the first angle; and

25 an angle display circuit for visually displaying a joint angle value based on the second electrical resistance.

16. A joint angle indication system for providing information related to an angular relationship between a first body part and a second body part which are pivotally coupled at a joint, the system comprising:

a first arm member operable for attachment to the first body part, the first arm member
5 having a first proximal end and a first distal end;

a second arm member operable for attachment to the second body part, the second arm member having a second proximal end and a second distal end, the second proximal end of the second arm member pivotally coupled to the first proximal end of the first arm member;

10 at least one joint angle variation sensor for providing at least one electrical characteristic which varies based on variation in a joint angle of the first arm member relative to the second arm member, where the joint angle is variable over an angular range which includes a first angle and a second angle;

a biofeedback circuit operable to generate a first feedback signal when the at least one electrical characteristic indicates the joint angle is less than or equal to the first angle, operable to generate a second feedback signal when the at least one electrical characteristic indicates the joint angle is greater than or equal to the second angle, and operable to generate no feedback signal when the at least one electrical characteristic indicates the joint angle is less than the second angle and greater than the first angle, where the second feedback signal is aurally different from the first feedback signal;

15 an audio output circuit for generating an audio angle indication signal having a frequency which varies in relation to a variation in the at least one electrical characteristic;

a microphone for generating an audio annotation signal; and

20 an audio recording device operable to record audio information on at least first and second audio information channels, the audio recording device for receiving and recording the audio angle indication signal on the first audio information channel, and for receiving and recording the audio annotation signal on the second audio information channel.

17. A method for providing information related to an angular relationship between a first body part and a second body part which are pivotally coupled at a joint, the method comprising:

5 (a) providing at least one electrical characteristic which varies based on variation in a joint angle of the first body part relative to the second body part, where the joint angle is variable over an angular range which includes a first angle and a second angle;

10 (b) generating an audio angle indication signal having a signal characteristic which varies in relation to a variation in the at least one electrical characteristic;

15 (c) generating an audio annotation signal;

(d) recording the audio angle indication signal on a first audio information channel of an audio recording device, and recording the audio annotation signal on a second audio information channel of the audio recording device;

18 (e) accessing the audio angle indication signal from the first audio information channel of the audio recording device, and accessing the audio annotation signal from the second audio information channel of the audio recording device;

20 (f) operating on the audio angle indication signal to derive a joint angle signal therefrom;

(g) displaying a joint angle value on a display device based on the joint angle signal; and

(h) providing an audible rendition of the audio annotation signal.

18. The method of claim 17 further comprising temporally correlating the joint angle value displayed in step (g) with the audible rendition of the audio annotation signal provided in step (h).

19. The method of claim 17 further comprising:

5 (i) generating a first feedback signal when the at least one electrical characteristic indicates the joint angle is less than or equal to the first angle; and

(j) generating a second feedback signal when the at least one electrical characteristic indicates the joint angle is greater than or equal to the second angle, the second feedback signal having a frequency higher than the first feedback signal.

20. The method of claim 17 wherein:

step (d) further comprises recording the audio angle indication signal on a first audio information channel of a portable cassette tape recorder, and recording the audio annotation signal on a second audio information channel of the portable cassette tape recorder; and

step (e) further comprises providing the first and second audio information channels of the portable cassette tape recorder to first and second channel inputs of a computer sound card.